

REMARKS

Claims 1-23 are pending in the application. Claims 1, 4-9, 15, and 17-18 have been amended, and claims 2-3, 10-14, and 19-23 have been withdrawn pursuant to a restriction requirement. No new matter has been introduced by the amendment.

Objection has been raised to claims 17 and 18 for recitation of the term "through-holes." The Applicant respectfully asserts that in the context in which the term "through-holes" appears in the claim, there is no ambiguity as to the meaning of this term with respect to claim 1, from which claims 17 and 18 depend. Claim 1 recites "two parallel plates each with a through-hole defining an optical input/output." Claims 17 and 18, in turn, recite particular features of at least one of the through-holes recited in claim 1. Since each parallel plate contains a through-hole, it necessarily follows that there are at least two through-holes recited in claim 1. Finally, the Applicant respectfully asserts that claims 17 and 18 properly depend from claim 1 and provide proper antecedent basis with respect to the elements recited in claim 1.

Claim Amendments

Claim 1 has been amended to improve its form by adding terms where necessary to ensure proper antecedent basis exists within the claim. Further, verbs and preparatory terms have been removed or replaced with more descriptive terms consistent with the device claim structure. Additionally, compositional phrases have been replaced with open transition claim terminology.

Claims 4-7 have been amended to change their dependency from withdrawn claim 2 to elected claim 1. Further, reference to the "third fastening stud" in claims 5 and 6 has been removed in view of the change in dependency of these claims.

Claims 8 and 9 have been amended to delete inadvertent terms appearing in these claims.

Claim 15 has been amended to define the recited range as applying to a distance.

Claims 17 and 18 have been amended to maintain consistency with the amendments of claim 1 from which they depend.

The foregoing amendments improve the form of the amended claims. No new matter has been introduced by the amendment.

Rejection Under 35 U.S.C. §102(e)

Claims 1 and 8-9 have been rejected over Li. This rejection is overcome in view of the following remarks.

Claim 1 recites an optical arrangement that includes two parallel plates. Each parallel plate includes a through-hole, and the through-holes define an optical input/output. The optical arrangement further includes first bumps and second bumps comprising a meltable material that when molten selectively wets the fastening studs to optically align the optical input/output of the two parallel plates.

The Applicant respectfully asserts that Li fails to suggest or disclose an optical arrangement having the features recited by claim 1. The Applicant respectfully disagrees with the characterization of Li at page 3 of the instant Office Action, in which element 38 of Li is described to be a through-hole. In contrast to the characterization set forth in the instant Office Action, element 38 is described by Li to be "a first set 38 of contact-receiving members 39." The set of receiving members are illustrated in Fig. 1A of Li and provide sites to which ball-type contacts (110) are bonded. Further, none of the contact bumps (44), (110), or (144) are used to connect two parallel plates whereas other bumps are used to connect one of these plates to a component placed between the parallel plates. Instead, Li discloses bumps that attach light-emitting package (100) and photo detector package (130) to the substrate (20).

The Office Action attempts to draw an analogy of the structure disclosed by Li to the optical arrangement of claim 1 by construing Li to disclose solder bumps (54) on one side of substrate (20) and solder bumps (110) on an opposite side of the substrate (20). Although the Office Action attempts to analogize the first fastening studs (30) and the second fastening studs (39) to the claimed first and second fastening studs, there is no explanation of how the substrate (20) meets the claimed recitation of "two parallel plates." Accordingly, the Applicant asserts that Li does not suggest or disclose all of the limitations recited by claim 1 and therefore fails to anticipate claim 1.

Claims 4-9 and 15-18 each depend from claim 1 and recite further aspects of the optical arrangement recited in claim 1. These claims are allowable over Li at least in view of the remarks pertaining to claim 1 from which they depend.

Rejection Under 35 U.S.C. §103(a)

Claims 4-7 have been rejected over Li in view of Casson et al. This rejection is overcome in view of the following remarks.

The Applicant respectfully asserts that neither Li nor Casson et al. suggest or disclose an optical arrangement in which two parallel plates are aligned to define an optical input/output. The Applicant's foregoing remarks pertaining to Li are incorporated herein. The Applicant respectfully asserts that Casson et al. fail to overcome the deficiencies of Li. This at least because Casson et al. fails to suggest or disclose bumps connecting the studs of two parallel plates while aligning the plates by selective wetting action. Instead, Casson et al. teach the use of bumps with solder paste and without any selective wetting of studs by the bumps. Although Casson et al. disclose a chip suspended on a molten solder mass that is allowed to self-align into a proper location and orientation on the substrate, the self-alignment is believed to take place between the solder bumps and the molten solder paste, and not between the bumps and the studs of substrates to be connected and aligned. Further, Casson et al. disclose that the bumps on the chip are provided in cups so that no effect of selective wettability can take place in the structure disclosed by Casson et al. Accordingly, the Applicant respectfully asserts that claims 4-7 distinguish over the combination of Li and Casson et al.

Claims 15-18 have been rejected over Li in view of Moon et al. This rejection is overcome in view of the following remarks.

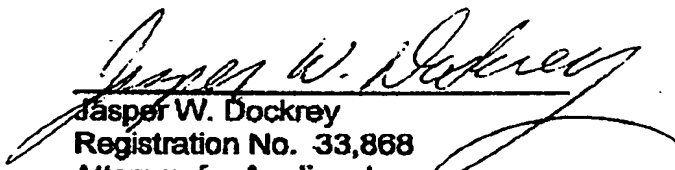
The Applicant respectfully asserts that claims 15-18 distinguish over Li in combination with Moon, et al. at least because neither reference suggests or discloses two parallel plates each having a through-hole defining an optical input/output. The Applicant's foregoing remarks pertaining to Li are incorporated herein. The Applicant respectfully asserts that the addition of Moon et al., does not overcome the deficiencies of Li. In addition to failing to disclose the claimed parallel plates, Moon et al. do not disclose

first and second bumps that when molten selectively wet fastening studs to optically align an optical input/output on the two parallel plates. Instead, Moon et al. disclose the flip-chip bonding of an optical device to a wafer, however, the bonding does not operate to align through holes in two parallel plates as recited by claim 1, from which claims 15-18 depend.

SUMMARY

The Applicant has made a novel and non-obvious contribution to the art of optical device design. The claims at issue distinguish over the recited references and are in condition for allowance. Accordingly, such allowance is now earnestly requested. The Examiner is invited to contact the undersigned attorney for the Applicant via telephone if such communication would expedite this application.

Respectfully submitted,


Jasper W. Dockrey
Registration No. 33,868
Attorney for Applicant

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, ILLINOIS 60610
(312) 321-4200